

The Effects of Outliers

An **outlier** is a number in a data set that is very different from the rest of the data. Outliers can have a big effect on the mean.

— Example —

Find the mean, median, and mode with and without the outlier for this set of data about the number of days 6 people exercised in one month: 4, 23, 21, 22, 21, 23.

Identify the outlier. Since most of data is in the low twenties, the outlier of the data set is 4.

Find the mean of the data set.
The mean is 19.

$$\begin{aligned}\text{Think: } 4 + 23 + 21 + 22 + 21 + 23 &= 114 \\ 114 \div 6 &= 19\end{aligned}$$

Without the outlier, 4, the mean of the data set is 22.

$$\begin{aligned}\text{Think: } 23 + 21 + 22 + 21 + 23 &= 110 \\ 110 \div 5 &= 22\end{aligned}$$

Find the median of the data set.
The median is 21.5.

$$\begin{aligned}\text{Think: } 4, 21, \underline{21, 22}, 23, 23 \\ \downarrow \\ 21.5\end{aligned}$$

Without the outlier, 4, the median of the data is 22.

$$\text{Think: } 21, 21, \underline{22}, 23, 23$$

Find the mode of the data set.
The modes are 21 and 23.

$$\text{Think: } 4, \underline{21, 21}, 22, \underline{23, 23}$$

Without the outlier, 4, the modes of the data remain the same, 21 and 23.

$$\text{Think: } \underline{21, 21}, 22, \underline{23, 23}$$

Try It Find the mean, median, and mode, with and without outliers for this set of data: 450, 420, 435, 450, 5500, 440, 425, 460.

- Identify the outlier. _____
- Organize your results in the table.

Miles Traveled Last Week		
	With Outlier	Without Outlier
Mean		
Median		
Mode		